

## DOCUMENT RESUME

ED 121 035

EC 082 713

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TITLE Cognitive Development Among Retardates: Reanalysis of Inhelder's Data.  
PUB DATE Apr 76  
NOTE 9p.; For Inhelder's study see ED 022 305  
EDRS PRICE MF-\$0.83 HC-\$1.67 Plus Postage  
DESCRIPTORS Adolescents; \*Age Differences; Childhood; \*Cognitive Development; \*Educable Mentally Handicapped; Exceptional Child Research; \*Intelligence Differences; Mentally Handicapped  
IDENTIFIERS Inhelder (Barbel); Piaget (Jean)

## ABSTRACT

A reanalysis of B. Inhelder's (1968) data concerning cognitive development among retardates was performed by selecting from the original 159 subjects a sample of 104 educable mentally retarded Ss (7-19 years old) who were diagnosed as fixated or nonfixated at three of the cognitive stages postulated by Jean Piaget. The results indicated that among fixated retardates, those at lower cognitive stages differed significantly in IQ and MA, while those at higher cognitive stages differed significantly in CA and MA. Among nonfixated subjects, differences between those at each cognitive stage were significant on CA and MA, but not on IQ. In contrast to fixated subjects, nonfixated subjects had significantly higher IQs and MA, and reached higher cognitive stages. It was concluded that a diagnosis of cognitive fixation seemed premature for preadolescent retardates, since the potential for cognitive growth through adolescence appeared strong. (LS)

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ED121035

## Cognitive Development among Retardates:

Reanalysis of Inhelder's Data<sup>1</sup>

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The purpose of this paper is to report a reanalysis of Inhelder's data on cognitive development among retardates. Through a qualitative analysis of their reasoning processes, Inhelder (1968) concluded that while the structure and content of retardates' logical thought was comparable to that of normal children, retardates progressed through Piagetian stages at a slower rate than normal children. Because of this slower progression, she believed, retardates remain at a particular stage for a longer time than normally expected, and the onset of mental deficiency occurs when the gap widens between their chronological age and cognitive level, and children can no longer recover from this decelerated rate of cognitive growth. Eventually this deceleration culminates in prematurely "fixated" cognitive growth, so that it is no longer possible for retardates to reach subsequent cognitive stages. She described these cognitive fixations as a state of pseudo-equilibrium in which operatory growth is static and arrested at an unnatural ceiling. Even mildly retarded persons are considered incapable of reaching the formal operational stage, while extremely retarded persons, such as idiots or imbeciles, are considered fixated much earlier

<sup>1</sup>Paper presented at the annual meeting of the American Educational Research Association, San Francisco, April 1976 (Session 7.03).

EC082713

at either the sensorimotor or early preoperational stages. However, moderately retarded persons are considered capable of reaching the concrete operational stage, but at incomplete and fixated levels. Thus, Inhelder delineated three stages at which retardates might become fixated: stage 1, a preoperational stage, in which no conservation was present; stage 2, an operational stage, with conservation of substance only; and stage 3, an operational stage, with conservation of substance and weight. In contrast to fixated subjects, a small proportion (10%) of subjects were classified as oscillators since they fluctuated between cognitive stages, and in the present analysis these subjects have been classified together as "nonfixated."

Inhelder's formulation presents several theoretical and methodological problems. First, a diagnosis of fixation, implying permanent stagnation of cognitive growth, seems premature without additional assessments over time, and a recent longitudinal study by Stephens (Stephens & McLaughlin, 1974) has reported continued cognitive development among both normal and retarded children through late adolescence. While the amount of cognitive gain over a two year period was inversely related to age, retardates in their late teens still showed significant improvement on several Piagetian tasks. It would appear then, that Inhelder's diagnosis of fixation may be unwarranted for some subjects, particularly those at younger ages.

Second, variables such as chronological age (CA), intelligence (IQ), and mental age (MA), which might distinguish between subjects at the three cognitive stages, or between fixated and nonfixated

subjects, were not fully explored by Inhelder. For example, were subjects who reached higher cognitive stages older, less retarded, or simply progressing through these stages at a faster rate than their counterparts at lower stages? One procedure used to address these questions, suggested by Zigler (1969), is to consider IQ as an index of the rate of cognitive development, and MA, or scores on Piagetian tasks, as indices of the level of cognitive performance. Another related issue is the extent to which CA, MA and IQ are correlated with cognitive stages for retardates, and whether these correlations resemble the pattern of correlations that have been observed between these variables among normal children (Jordan & Jordan, 1975). Thus, the present analysis will consider the effects of CA, MA and IQ on cognitive stages for fixated and nonfixated subjects, and the pattern of correlations among these variables for all subjects.

A third problem with Inhelder's formulation was the extreme heterogeneity of her sample. The sample contained subjects who ranged in age from 7½ to 52 years old; whose IQ's ranged from 45 to 104; and who were both institutionalized and noninstitutionalized with a range of organic etiologies and physical illnesses. Thus, the present analysis was designed to address these theoretical issues by quantifying the relationship between Inhelder's cognitive stages and CA, MA and IQ. The analysis was restricted to familially retarded subjects who met the following criteria: under 19 years of age; an IQ between 52 to 83 (corresponding to current A.A.M.D. guidelines for borderline and mild familial retardation); and with no known organic etiology or physical illness. Thus, the original

sample of 159 subjects was reduced to 104, consisting of 84 fixated, and 20 nonfixated subjects.

### Results and Discussion

The analysis of Inhelder's data according to CA, MA and IQ is presented in Table 1. The first issue considered was whether subjects who were diagnosed as fixated at one of the three cognitive stages would differ in CA, MA or IQ. Overall  $F$  tests indicated that the main effects of all three variables were significant ( $F(2, 81) = 12.93, 42.64$  and  $9.19$  respectively,  $p < .01$ ). Pairwise comparisons (all significant at  $p < .05$  by a Scheffe test) indicated that subjects fixated at stage 3 were significantly older than subjects at stages 1 and 2, while subjects at stages 1 and 2 did not differ in age from each other. Subjects fixated at stages 2 and 3 were significantly higher in IQ than those at stage 1, while subjects at stages 2 and 3 did not differ in IQ from each other. Finally, subjects at stage 3 were significantly higher in MA than those at stage 2, and subjects at stage 2 were significantly higher in MA than those at stage 1. Thus, the pattern which emerged for fixated subjects is that those at stages 1 and 2 were both approximately 11 years old, but stage 2 children were higher in IQ and MA than stage 1 children. In contrast, children at stage 3 were chronologically and mentally approximately three years older than children at stage 2, but these groups did not differ with respect to their rate of development, or IQ. Since retardation implies a developmental lag, it is not surprising that preadolescent retardates (at stages 1 and 2) were not conserving on weight and substance as were their stage 3 counterparts. However, since

stage 2 and 3 retardates were significantly different on the developmental variable of CA, it is possible that with the passage of time, many of the younger stage 2 subjects would progress to stage 3, and likewise many of those at stage 1 would progress to stage 2 and possibly beyond.

A second issue considered was the extent to which subjects diagnosed as nonfixated at the three cognitive stages differed among each other on CA, MA and IQ. Overall  $F$  tests indicated that the main effects for CA and MA were significant ( $F(2, 17) = 44.31$  and  $42.99$  respectively,  $p < .01$ ) but not for IQ, and pairwise comparisons indicated that differences between subjects at each cognitive stage on both CA and MA were significant ( $p < .05$ ). Thus, these data indicated that the progression through cognitive stages for these nonfixated subjects was primarily a function of developmental variables of chronological and mental age, rather than a function of their IQ, or rate of development, so that continued cognitive development for nonfixated subjects at lower stages would be expected with the passage of time.

A third issue considered was the extent to which fixated and nonfixated subjects differed on CA, MA and IQ. Across cognitive stages, fixated and nonfixated subjects did not differ on CA, but fixated subjects had significantly lower MA ( $p < .05$ ) and IQ ( $p < .01$ ), and had a significantly lower average cognitive stage than nonfixated subjects (1.8 and 2.5 respectively,  $p < .01$ ). Thus, it appeared that the higher level of cognitive performance reached by nonfixated subjects was due primarily to their faster rate of development, since these groups did not differ on their respective

chronological ages.

A final issue considered was the pattern of correlations across all subjects between cognitive stages on the one hand, and CA, MA and IQ on the other hand. The correlations of CA, MA and IQ with cognitive stage were .46, .73, and .47 respectively ( $p < .001$ ), suggesting that while all variables were significantly related to conservation performance, MA yielded a significantly ( $p < .001$ ) stronger correlation with conservation than either CA or IQ. This pattern of correlations closely resembled one which has been observed among normal children (Jordan & Jordan, 1975), indicating a correspondence between normal and retarded children with respect to the relationships between Piagetian performance and CA, MA and IQ.

In sum, these analyses reveal the potential for continued cognitive growth among retardates who were diagnosed as fixated by Inhelder, since one major difference between subjects at lower and higher cognitive stages was chronological age. While a ceiling on cognitive development may exist for retardates, these results argue against premature assessments that the ceiling has been reached, particularly among preadolescent retardates, without reassessment of their cognitive functioning through adolescence and adulthood.

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Table 1

Summary Statistics for Fixated and Nonfixated  
Retardates at Three Cognitive Stages

| Group           | Cognitive<br>Stage | CA    |      |                 | MA    |      |                | IQ    |      |       | N   |
|-----------------|--------------------|-------|------|-----------------|-------|------|----------------|-------|------|-------|-----|
|                 |                    | M     | SD   | Range           | M     | SD   | Range          | M     | SD   | Range |     |
| Fixated         | 1                  | 11.38 | 2.09 | 7.92-<br>16.42  | 7.47  | 1.13 | 5.78-<br>11.52 | 66.45 | 7.29 | 53-82 | 42  |
|                 | 2                  | 11.81 | 1.88 | 8.17-<br>17.75  | 8.35  | 1.10 | 5.88-<br>11.89 | 71.10 | 5.11 | 60-80 | 30  |
|                 | 3                  | 14.57 | 1.38 | 12.92-<br>17.12 | 10.81 | .99  | 9.10-<br>12.53 | 74.42 | 5.87 | 63-83 | 12  |
|                 | Total              | 11.99 | 2.19 | 7.92-<br>17.75  | 8.26  | 1.56 | 5.78-<br>12.53 | 69.25 | 7.00 | 53-83 | 84  |
| Nonfix-<br>ated | 1                  | 9.00  | .61  | 8.42-<br>9.92   | 7.07  | .62  | 6.44-<br>7.93  | 78.50 | 2.07 | 75-80 | 6   |
|                 | 2                  | 11.28 | 1.30 | 10.17-<br>13.42 | 8.87  | .83  | 7.93-<br>9.93  | 78.80 | 3.35 | 74-82 | 5   |
|                 | 3                  | 14.00 | 1.06 | 12.58-<br>15.58 | 10.68 | .77  | 9.90-<br>12.13 | 76.44 | 4.90 | 69-82 | 9   |
|                 | Total              | 11.82 | 2.40 | 8.42-<br>15.58  | 9.15  | 1.73 | 6.44-<br>12.13 | 77.65 | 3.86 | 69-82 | 20  |
| All subjects    |                    | 11.96 | 2.20 | 7.92-<br>17.75  | 8.43  | 1.63 | 5.78-<br>12.53 | 70.87 | 7.30 | 53-83 | 104 |